

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:                      Prior Group Art Unit: 1775  
Takahiro ISHIKAWA et al.              Prior Examiner: Jennifer McNeil  
Serial No.: Rule 1.53(b) Div. Of  
   S.N. 09/603,203 filed  
   June 26, 2000

Filed: January 3, 2002

For: METHOD FOR BONDING DIFFERENT MEMBERS AND  
COMPOSITE MEMBERS BONDED BY THE METHOD

PRELIMINARY AMENDMENT

Commissioner for Patents  
Washington, D. C. 20231

Sir:

Prior to examination of the above-identified application,  
please enter the following specification changes as noted below:

IN THE ABSTRACT:

Please substitute the following Abstract for the originally  
filed Abstract:

A bonding method for bonding one member having a dented  
portion and a second different member having an engaging  
protruding portion with an adhesive composition having a

controlled coefficient of expansion and the resultant composite product. Three alternative techniques are used to first apply a hard solder in contact with a layer of fine particles between the two members. Then a final heating is applied under pressure to melt the hard solder. The resulting bonding layer bonds the two different fitting members.

IN THE SPECIFICATION:

Page 1, before line 5, insert the following new paragraph:

-This is a Division of application Serial No. 09/603,203, filed June 26, 2000, now allowed.--

REMARKS

This application is a Rule 1.53(b) Divisional Application of Serial No. 09/603,203, filed June 26, 2000, now allowed.

Claims 1-9 remain herein. Claims 11-15 have been cancelled without prejudice or disclaimer.

The abstract and the specification have been amended in the same manner as in the parent application and to identify the parent application.


Filed herewith is an Information Disclosure Statement listing all references cited during prosecution of the parent application.

Prompt and favorable examination of this application on the merits is respectfully solicited.

Respectfully submitted,

PARKHURST & WENDEL, L.L.P.

January 3, 2002  
Date

  
Roger W. Parkhurst  
Registration No. 25,177

Attachments:

Specification and Abstract Mark Up

RWP/ame

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## METHOD FOR BONDING DIFFERENT MEMBERS AND COMPOSITE MEMBERS

## BONDED BY THE METHOD

## BACKGROUND OF THE INVENTION

This is a division of application serial No. 09/603,203, Filed June 26, 2000,  
5 now allowed.

The present invention relates to a composite member comprising two or more different members bonded through a fitting structure, and a method for bonding the different members through a fitting structure. More particularly, it relates to a composite member comprising two or more different members which are bonded to each other with an adhesive composition controlled in its expansion coefficient through a fitting structure, and a method for producing the composite member by bonding two or more different members with an adhesive composition controlled in its expansion coefficient.

15 There is a method of using a solder for bonding, for example, a ceramic member and a metallic member. However, during cooling operation after bonding them at high temperatures, thermal stress is generated owing to the difference in thermal expansion coefficient between the different members or between the member and the solder used for bonding of these different members to cause separation at the bonded interface, or if one of the members is fragile, cracks occur in the vicinity of the bonded interface and sometimes the desired bonding strength or airtightness cannot be obtained.

20 The products in which these defects are caused during the production steps must be disposed of as rejected products, and this results in increase of the production cost of these composite members. Moreover, if they are subjected to thermal

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Version with markings to show changes made

~~Provided is a bonding method in which two or more different members are bonded through a fitting structure by forming a bonding layer of an adhesive composition controlled in expansion coefficient, even if the clearance between wall surfaces of the different members in the fitting structure is not enough to pour a given amount of a hard solder therein, and a composite member made by the method is further provided.~~

~~The above method comprises a step of uniformly spreading a fine particle material over the surface of the dented portion of the member having the dented portion, then disposing a platy or powdery hard solder so as to cover at least a part of the layer comprising the fine particle and further disposing the member having the protruded portion, a step of uniformly spreading a fine particle material over the surface of the dented portion of the member having the dented portion and disposing the member having a protruded portion having one or a plurality of holes in which a hard solder is inserted so that the member closely contacts with the layer comprising the fine particle material, or a step of previously preparing the member having a protruded portion at the end of which is formed a layer comprising a hard solder and a fine particle material, disposing a hard solder on the surface of the dented portion of the member having the dented~~

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portion and disposing thereon the member having the protruded portion,

— and a step of heating them to a given temperature under application of pressure to melt the hard solder and impregnating the fine particle material with this molten hard solder to form a bonding layer comprising the hard solder and the fine particle material, thereby to bond the different members through the fitting structure.

A bonding method for bonding one member having a dented portion and a second different member having an engaging protruding portion with an adhesive composition having a controlled coefficient of expansion and the resultant composite product. Three alternative techniques are used to first apply a hard solder in contact with a layer of fine particles between the two members. Then a final heating is applied under pressure to melt the hard solder. The resulting bonding layer bonds the two different fitting members.

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